

ON SOME MICROTINE-INFESTING POLYPLAX

(ANOPLURA)

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For some years the relationship of *Polyplax borealis* Ferris, 1933, (from *Clethrionomys rufocanus*, Finnmark, Norway) to *P. alaskensis* Ewing, 1927, (from *Microtus* sp., Alaska) has been in doubt. The original description of *P. alaskensis* contains no figures and is vague in many details. Ferris noted in his original description of *borealis* that this name might prove to be synonymous with *alaskensis* Ewing, since he had not seen specimens of *alaskensis* and could not be sure of his interpretation of the latter. Ewing (1935) synonymized *borealis* Ferris under *alaskensis* Ewing, without seeing specimens of *borealis*. Quay (1949) published a redescription and figures of *alaskensis* from *Microtus operarius*, Seward Peninsula, Alaska, but did not mention *borealis*. Finally, in 1951, Brinck published a note asserting that *borealis* is a valid name, basing his conclusions on a comparison of Quay's drawings and description of *alaskensis* and Ferris' original description and figures of *borealis*.

A re-examination of *P. alaskensis* holotype proves Brinck to be correct, and further shows that *Polyplax abscisa* Fahrenholz, 1938, (from California off "*Arricola*," which according to Ferris (1951) probably means *Microtus*), is a synonym of *P. alaskensis* (**new synonymy**). Dr. G. F. Ferris of Stanford University has kindly compared specimens of *borealis* from Alaska and Labrador with his paratype male of *borealis* and also has compared the holotype of *alaskensis* with *borealis* and California "*abscisa*," coming to the same conclusion. Specimens of *Polyplax* from California *Microtus* agree with Fahrenholz's original description and figures of *abscisa* as well as with holotypic *alaskensis*. A figure of *alaskensis* holotype is included in this paper (fig. 3).

P. alaskensis is easily separated from *borealis* in the male by the shape of the pseudopenis (fig. 8), which is strongly curved apically and relatively much narrower than it is in *borealis* (fig. 7). Both sexes of *borealis* have an areuate first abdominal sternum (figs. 9, 10), and the third abdominal sternite is triangulate, more than half as high (in the longitudinal axis of the body) as it is broad (in the transverse axis of the body). *P. alaskensis* (fig. 11) may have the first sternite weakly areuate, but usually not approaching the condition found in *borealis* and the third sternite is less than half as high as broad and not markedly triangulate. There are small discrepancies between Quay's redescription of *alaskensis* and the actual form of the holotype, although the lone specimen from his series we examined agrees well with the holotype. This single male, from *Microtus*

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operarius, does not have the first sternite as strongly arcuate as he draws and describes it. He also states that the first sternite of the female is broader than the second and concave posteriorly, but his figure does not show this to be the case. The thoracic sternal plate in *alaskensis* is normally quite broad anteriorly and with the sides angled and subsequently slightly concave to the apex, as in figure 6, whereas *borealis* has the sides almost evenly convex to the apex (figs. 4, 5). In other respects *alaskensis* and *borealis* are very similar morphologically. Brinck (1951) mentions that in *borealis* the paratergal plates (fig. 2) are not as markedly toothed as in *alaskensis*, but this character is quite variable.

Both sexes of *alaskensis* and *borealis* may be separated from the very similar *P. spinulosa* (Burmeister) by the shape of the paratergites 3-5. In *alaskensis* and *borealis* both dorsal and ventral apical lobes are acute, while in *spinulosa* the ventral apical lobes of these paratergites are rounded. Ewing (1935) used this character to separate *alaskensis* from *spinulosa*.

Since Ferris' (1951) publication "The Sucking Lice" will be the standard reference on Anoplura for many years to come, we append here a revision of couplets 21 and 22, page 205, of the key to *Polyplax* species. It should be noted that as Ferris' key now reads, *borealis* will key to *alaskensis* and *alaskensis* will key to *abseisa*.

21(20) First abdominal sternite strongly arcuate and with its lateral angles somewhat prolonged; third abdominal sternite more than half as high (in longitudinal axis of body) as broad (in transverse axis of body); occurring on *Clethrionomys* and *Phenacomys* **BOREALIS**

First abdominal sternite in both sexes not thus, its posterior margin almost straight and the lateral angles not produced; third abdominal sternite considerably less than half as high as broad 22

22(21) In both sexes, paratergal plates 3-5 with only the dorsal apical angle produced into a point; dorsal lobe of the pseudopenis very short, scarcely one-fourth the length of the ventral lobe; parameres well developed, extending forward between the posterior arms of the basal plate; occurring especially on species of *Rattus* throughout the world **SPINULOSA**

In both sexes, paratergal plates 3-5 with both apical angles produced into points; parameres quite weakly developed and extending forward only slightly past the apex of the arms of the basal plate; normally occurring on species of *Microtus* **ALASKENSIS**

The normal hosts of *Polyplax alaskensis* are members of the genus *Microtus*. Specimens have been examined as follows: Alaska (Golovin, Takotna and the Seward Peninsula, and the holotype) from *Microtus* sp. and *M. operarius*; Oregon from *M. montanus*; California from *M. californicus sanctidiegi*; Virginia, Pennsylvania, Delaware, New York, Massachusetts and Maine from *Microtus pennsylvanicus*; Massachusetts from *M. breweri* (this species of *Microtus* is found only on Muskeget Isl.); Canada, "from an island in the St. Lawrence

River" from *M. pennsylvanicus* and at Toronto, Ontario from "meadow mouse." Ferris (1951) also reported *alaskensis* (as *abscisa*) from Nevada. Scanlon (1954) reported *alaskensis* (as *abscisa*) from *Microtus montebelli*, Mt. Fuji, Japan. A re-examination of some of Sasa's material from *Microtus montebelli*, Mt. Fuji, reported as *Polyplax spinulosa* (Burmeister) (Sasa, 1950) establishes that these specimens are *alaskensis*, not *spinulosa*. One female with the sides of the thoracic sternal plate somewhat less angled than is usually the case, from a species of *Synaptomys* (bog lemming, tribe Lemmini), Norway House, Northwest Territories, Canada, is also here referred to *alaskensis*.³

P. borealis has as its normal hosts species of *Clethrionomys* and *Phenacomys*. Its distribution is circumpolar, as is probably true of *alaskensis*, but *borealis* is more northern, although there is some overlapping. Specimens of *borealis* have been examined as follows: Alaska (Ladd Air Force Base) from *Clethrionomys rutilus dawsoni*; Canada, Northwest Territories, S. W. Keewatin from *Phenacomys* sp. and *Clethrionomys* sp., and Quebec and Labrador from *Clethrionomys* sp. Specimens from *Clethrionomys rufocanus* (the type host) from Korea, were reported as *alaskensis* by Scanlon (1955). The latter specimens and a Korean series from "*Apodemus speciosus*" differ slightly from the North American specimens in that the sternal plate of the thorax is somewhat broader anteriorly, but this series still fits well within the limits of *borealis*. "*Apodemus speciosus*" is probably a *lapsus* for a species of *Clethrionomys*.

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³This specimen was referred to by Ferris (1922) and Hopkins (1947) as *Polyplax spinulosa*.

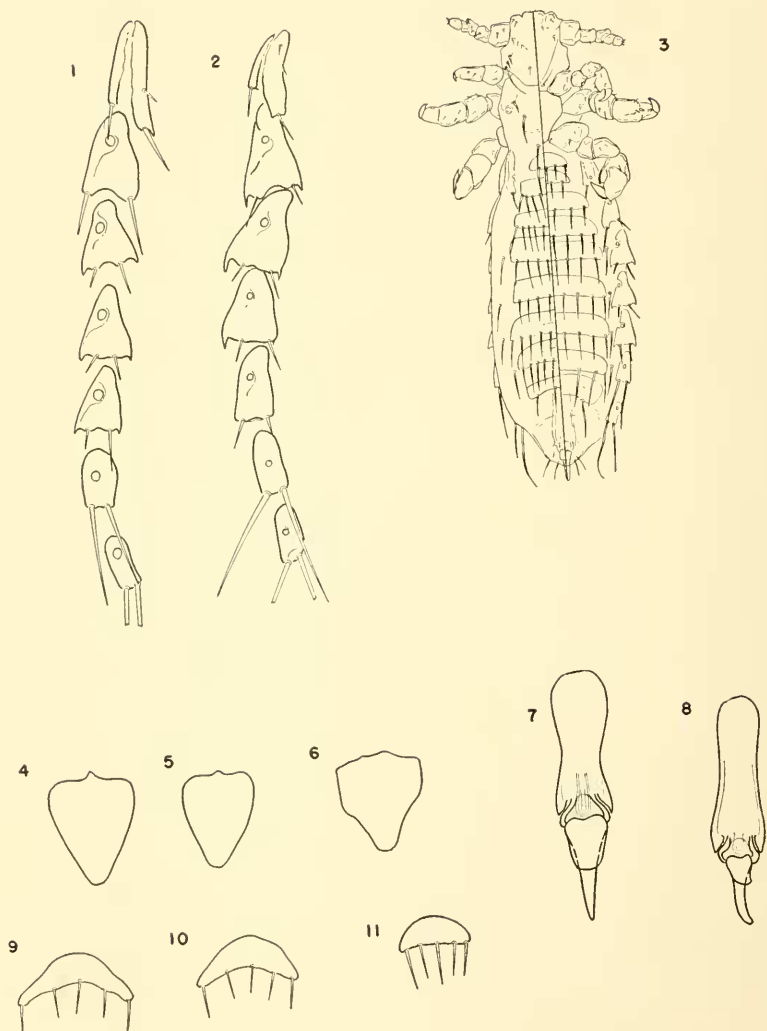


Fig. 1, *Polyplax alaskensis* Ewing, 1927: paratergal plates, holotype; fig. 2, *P. borealis* Ferris, 1933: paratergal plates, male (Ladd Air Force Base, Alaska); fig. 3, *P. alaskensis*: holotype; fig. 4, *P. borealis*: thoracic sternal plate, male (Ladd AFB); fig. 5, *P. borealis*: thoracic sternal plate, male (Lake Marymac, Quebec); fig. 6, *P. alaskensis*: thoracic sternal plate, holotype; fig. 7, *P. borealis*: aedeagus (Lake Marymac); fig. 8, *P. alaskensis*: aedeagus, holotype; fig. 9, *P. borealis*: first abdominal sternite, male (Ladd AFB); fig. 10, *P. borealis*: first abdominal sternite, male (Lake Marymac); fig. 11, *P. alaskensis*: first abdominal sternite, holotype.

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**OBSERVATIONS ON THE BIOLOGY AND LIFE HISTORY
OF THE BROWN COCKROACH PERIPLANETA BRUNNEA BURMEISTER**

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The brown cockroach, *Periplaneta brunnea* Burmeister, is a common species in the southern and southeastern United States, from the Carolinas to Florida and west to Texas. It has been found indoors as far north as Philadelphia and was collected by the writer in Columbus, Ohio. In some areas of the south it is more common than the American cockroach which it closely resembles.

This insect, typical of all roaches, is an obnoxious household pest. It has been collected in such places as army camps, outbuildings, city dumps, grocery stores, at lights, under bark, and in sewers.

Little is known about the biology of *P. brunnea* because only in recent years have entomologists become generally aware of the distinction between this species and the other three species of *Periplaneta* found in the United States. *P. brunnea* very closely resembles the American cockroach *Periplaneta americana* Linn., and there are some marked similarities and differences in biology.

The determination of *P. brunnea* was made through the courtesy of Dr. P. W. Oman and Dr. A. B. Gurney, of the Insect Identification and Parasite Introduction Laboratories, Entomology Research Division, United States Department of Agriculture. The writer is indebted to Dr. Ross Hutchins, of the Department of Zoology and Entomology, Mississippi State College, for the use of the controlled temperature equipment.

METHODS

Cultures of *P. brunnea* were started with adults and nymphs collected in March 1952, from the basement of the biology greenhouse on the campus of the Ohio State University. These cultures were transported by automobile to Mississippi State College where biological studies of *P. brunnea* were made from 1954 through 1956.

The cockroaches were reared in 1-gallon battery jars, the tops of which were covered with cheese cloth held in place by a rubber band.